

REMARKS

In the Office Action of April 18, 2002, Claims 1 - 10 were rejected. No claim was allowed. In response, Claim 1 is amended. Reexamination and reconsideration are respectfully requested in view of the foregoing amendments and the following remarks.

Rejection of Claims 1 - 10 under 35 U.S.C. §112, second paragraph

Claims 1 - 10 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Examiner states that he is uncertain about how and why the quantum number of orbital angular momentum and the quantum number of the excited state spin are convertible into each other. The Examiner alleges that although these two quantum numbers explain electron physical properties, these physical properties are mutually exclusive.

This rejection is respectfully traversed. In the present invention, organic molecules are coordinated to a heavy metal such as Ir or Pt as a central metal, and thereby the quantum number of orbital angular momentum and the quantum number of excited state spin become convertible into each other. This phenomenon is explained, for example, in textbooks such as C.J. Ballhausen, Introduction to Ligand Field Theory, McGraw-Hill, 1962.

Withdrawal of the rejection of Claims 1 - 10 under 35 U.S.C. §112, second paragraph, is therefore respectfully requested.

Rejection of Claims 1 - 5 under 35 U.S.C. §102(b) over Baldo

Claims 1 - 5 were rejected under 35 U.S.C. §102(b) as anticipated by Baldo (U.S. Patent No. 6,097,147). The Examiner alleges that Baldo et al discloses an electro-

luminescent electron-hole photon layer containing 4,4'-N,N'-diacarbazole-biphenyl (CBP) with 2,3,7,8,12,13,17,18-octaethyl-21H,23H-morphine platinum (PtOEP) (See Figure 3 layer 513 and column 5 lines 40-45).

This rejection is respectfully traversed. Baldo discloses a technique that involves adding only one dopant (PtOEP) to CBP as a matrix. However, independent Claim 1 of the present application differs from Baldo in that there are two kinds of dopants in the light-emitting layer, that is, (1) a material wherein the quantum number of orbital angular momentum and the quantum number of excited state spin are convertible into each other (spin conversion material) and (2) a light-emitting molecule (PtOEP). This requirement enlarges the scope of materials that can be used, thereby allowing for the best selection and remarkable improvements in characteristics. For example, even if a spin conversion material has no light-emitting properties when evaluated as a single molecule, the spin conversion material can be selected (see, for example, page 7, lines 18 - 20 of the specification), and a higher efficiency of selection of a light-emitting molecule becomes possible in a concentration range where concentration disappearance of the light-emitting molecule is not caused. This point is not disclosed at all in Baldo.

Accordingly, it is respectfully submitted that Claims 1 - 10 are not anticipated by Baldo et al.

Rejection of Claims 6 - 10 under 35 U.S.C. §103(a) over Baldo in view of Sakai

Claims 6-10 are rejected under 35 U.S.C. §103(a) as being obvious over Baldo et al in view of Sakai et al (U.S. Patent No. 6,224,966). The Examiner alleges that Baldo discloses an electro-luminescent electron-hole photon layer containing 4,4'-N,N'-diacarbazole-biphenyl (CBP) with 2,3,7,8,12,13,17,18-octaethyl-21H,23H-morphine

platinum (PtOEP). The Examiner acknowledges that Baldo does not disclose the light-emitting layer and the organic film formed by simultaneous vapor deposition. The Examiner alleges that Sakai teaches two electrically heated boats prepared in a vacuum vapor deposition chamber where one of the boats is loaded with an organic host substance and the other is loaded with a fluorescent substance and discloses simultaneous vapor deposition so that the organic light-emitting layer would be doped with the fluorescent material. The Examiner takes the position that it would have been obvious to modify Baldo's teachings in view of Sakai's teachings of simultaneous vapor deposition of an organic light-emitting material with a fluorescent material.

This rejection is traversed. As discussed above, Baldo does not disclose or suggest a material having two kinds of dopants in the light-emitting layer, that is, (1) a material wherein the quantum number of orbital angular momentum and the quantum number of excited state spin are convertible into each other (spin conversion material) and (2) a light-emitting molecule (PtOEP). Further, Sakai does not teach or suggest this feature. Therefore, Baldo and Sakai, alone or together, do not teach or suggest the claimed invention.

Accordingly, it is respectfully submitted that Claims 6 - 10 would not have been obvious over Baldo and Sakai.

Conclusion

In view of the foregoing amendments and remarks, it is respectfully submitted that Claims 1 - 10 are in condition for allowance. Favorable reconsideration is respectfully requested.

Should the Examiner believe that anything further is necessary to place this application in condition for allowance, the Examiner is requested to contact applicants' undersigned attorney at the telephone number listed below.

Kindly charge any additional fees due, or credit overpayment of fees, to Deposit Account No. 01-2135 (500.40580X00).

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP

By

A handwritten signature in black ink, appearing to read 'R. Webb', is written over a horizontal line. To the right of the signature is a checkmark.

Ralph T. Webb
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RTW/dlt

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IN THE CLAIMS:

1. (Amended) An electroluminescent film device having a light-emitting layer where an excited state generated by electron-hole recombination is utilized for photon generation, in which device the light-emitting layer contains;

a material in which the quantum number of orbital angular momentum and the quantum number of excited state spin are convertible into each other by their interaction, and

a light-emitting molecule ~~mixed into the above material~~ each as an independent dopant.